respond as quickly as possible, using as much care and gentleness in his examination and treatment as if it were a private case paying a good fee. Should the surgeon not show proper attention to a railroad man, he feels it much more keenly than if he were a private patient. We should always remember that "what is worth doing at all is worth doing well."

The relation of the surgeon to the railroad company is sometimes misunderstood. Surgeons are liable to error, as they may feel that they cannot serve well both the patient and the railroad company. In a case of accident the surgeon should always make a very careful examination, to determine if possible the precise nature of the injury. After the examination has been concluded the surgeon should render an honest and conscientious report. The patient should not expect the surgeon to do dishonest work for him, which he himself would not do. There is no easier way for a patient to lose confidence in the surgeon than for him to show a disposition to be unfair. A patient places his life in the surgeon's hands, and he must deal justly with him. On the other hand, the railroad company does not expect a report biased in their favor. What they want is to know the full extent of the injury and the probable time of recovery. A settlement with the injured party is based on the surgeon's opinion, and if the opinion is given honestly he has done all that can be expected of him.

The railway surgeon more than anyone else should be a thoughtfully conservative man. He should judge clearly and weigh carefully the ultimate probabilities. Again and again is he confronted with conditions which call for the exercise of the coolest judgment and the most careful consideration of the final consequences of what he must do at once. On him will often fall the responsibility which subsequently may mean much to the company in whose service he is enlisted; much of credit or much of blame. True, there is very often but little time in which to consider and weigh the pros and cons, and it is for that reason that I wish to impress upon you the importance of reasoning conservatism. One may always take away a little more, but one cannot replace what has been removed. Immediate amputation may seem to be imperatively demanded; yet if we temporize and watch the patient carefully, we may find that this more conservative treatment will result in the saving of a good and fairly useful limb. My rule is to cleanse the wound as well as possible, and control the hemorrhage; the slight oozing, as a rule, will stop on packing the wound gently with antiseptic gauze, slight pressure being made—not too great to interfere with the circulation. After this is done I cover the limb for some distance above the injury with antiseptic gauze (I prefer bi-chloride, slightly moistened), then apply a roll of cotton over the gauze and cover the whole limb with a large piece of oil silk. This can be held firmly in position by the roller bandage or with adhesive strips, as the surgeon may elect. By this method the normal temperature of the lower portion of the extremity is maintained by the natural heat from the upper part. I let this dressing remain on the limb for at least 12 hours, then remove it and examine the limb. If there is a sufficient number of blood vessels remaining, collateral circulation will indicate to the surgeon whether nature is capable of repairing the injured parts. The time for shock is now probably past, and we are able to determine whether amputation should take place or an attempt should be made to save the limb. We should always keep in view the fact that a workingman's limbs are his stock in trade, and if we take them away from him we deprive him of his capital. The limb may not be quite as serviceable as originally, but the laborer will manage in some way to make a living, while if his limb has been removed he feels that he is a pauper and of but little use to himself or anyone else. In a great majority of such cases men become beggars and loafers, and make no effort to earn their own living. Let us act on the side of humanity, and be guided by conservatism in all cases of injury.

# EARLY OPERATION OF GALL-STONE DISEASE.*

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THE surgical treatment of gall-stone disease is a subject so extensive and one whose literature is so vast that it is a sheer impossibility to make an adequate presentation of it in a single paper. It seemed best, then, to select for this occasion a single phase of the subject and I have accordingly chosen as most appropriate for discussion before a society composed of both physicians and surgeons, a subject which presents common ground on which all the members may meet; viz., "The Value of Early Operation in Gall-stone Disease." Matters of the more intimate indications, in particular pathological conditions and the indications for particular operative procedures, are more appropriate for detailed discussion before societies of surgeons, but since physicians come into contact with cases of gall-stone disease before the surgical specialists see them, a free discussion of this common ground may be well timed; not that I can say much that is new to this audience, or that has not been said before, but I would say that as a conclusion drawn largely from my own operative cases, limited though they be, it is evident to me that there is need for wider conviction as to the advantages of early operation in gall-stone disease.

While the etiology of gall-stones is being rapidly worked out by the experimental pathologist, the symptomatology and the diagnosis by physician and surgeon together, the chief advances in the treatment have been by the practical work of the abdominal surgeon. A few great names stand out pre-eminent in gall-stone surgery, and it is a matter of considerable national pride that many of them are Americans. I would mention Courvoisier, Langenbuch, Robson, Kocher, Kehr, Richardson, Fenger, Halsted, Murphy, Davis and Mayo brothers.

The most hurried glance through the history of gall-stone surgery will show a decided tendency on the part of operators to choose their procedure and the time of operation more and more in view of the late and more serious complications and sequellæ of gall-stone disease. In this field, perhaps more than any other, simplification of procedure means anticipation and attack before the more serious complications have arisen; it means seizure of the time for removal of the gall-stones, which are in reality foreign bodies, while the conditions surrounding them are still simple. Richardson has called attention to the analogous conditions presented by gall-stone disease and appendicitis and to how early operation in each case will prevent the more dangerous later conditions. Ochsner has emphasized the fact that a large percentage of cases of gastric troubles have their origin in the irritation produced by gall-stones which may manifest themselves in no other way, and argued for the early removal of such gall-stones.

While the mere presence of gall-stones in the gall-bladder does not constitute gall-stone disease, and may be looked upon as the result of an infectious inflammation, rather than the primal cause, still the history of great numbers of cases shows the vastly greater frequency of attacks of cholecystitis and cholangitis in the presence of gall-stones than in their absence. Therefore gall-stone disease may be looked upon as a group of essentially surgical affections based upon the mechanical conditions produced by the presence of gall-stones. Such a mechanical cause can be removed, so far as we now know, only by mechanical means. Internal medication has meaning in prophyllaxis because much can be done by rational treatment and proper living to maintain a high standard of general health and thereby diminish the probability of the formation of gall-stones; but after gall-stones have once formed, about all that can be accomplished by medical means is the greater or less relief afforded as to certain symptoms by lessening in-

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testinal irritation. But this relief is seldom, if ever, cure.

The passage of a biliary calculus into the intestine with the enormous relief from the symptoms caused by the calculus in its descent, is often heralded as a cure; but the history of such cases shows too often that there are other calculi left behind which later cause more trouble than that which passed. It is the rarest thing for gall-stones to be formed singly. While single large stones are often enough encountered, they generally show evidences of having had companions; furthermore, the accepted theory of the formation of biliary calculi almost precludes the possibility of the formation of single calculi, whether they be formed about colonies of attenuated bacteria as nuclei or bits of debris cast off from the mucous membranes, both being the result of infection of the gall-bladder and therefore multiple. The passage of one calculus is no guarantee that all that are present will pass, even if they be all of one size, as they often are, having been formed as a result of the same infection. But every pathologist and every surgeon knows from experience that in a great proportion of cases there are two or more "crops" of gall-stones, so to speak—a series of small ones co-existing with one or more series of larger ones—and the passage of a small gall-stone is still less a guarantee that the larger ones will pass. Moreover, small gall-stones produce as serious pathological conditions as larger ones and even the very passage of small gall-stones is not at all an innocent matter, it is, for example, the commonest cause of acute and chronic pancreatitis. (Opie.)

Again, it would seem that undue weight is given the idea that the vast majority of people harboring gall-stones in their gall-bladders have no trouble attributed to them. Kehr speaks of only 5% having definite painful attacks. Robson, however, calls attention to a large class of cases in which "chronic invalidism" is due to quiescent gall-stones, and doubtless lesser degrees of invalidism are more common, still. It would seem that in cases with quiescent gall-stones there often are symptoms indicating the condition if only the physician has the diagnostic acumen and the industry to find them. Perhaps more often the symptoms are recognized but are attributed to some other cause. Such figures as those of Riedel, in which he estimates that there are 2,000,000 people in Germany with gall-stones, are gathered from post-mortem statistics and do not apply very definitely in the matter of symptomatology, i. e., we cannot say that the 95% have had no trouble caused by them. I have no doubt that if we as medical men were more on the lookout for gall-stones as the cause of obscure digestive disturbances we should find them far oftener than we had suspected, and that thus finding them we would be enabled by a simple and comparatively safe operation to permanently relieve the patient.

I have mentioned prophyllactic medication; there is such a thing as prophyllactic operation in gall-stone disease, and by that I mean operation at a time before serious pathological conditions have arisen. I think that the surgical world is pretty well agreed, in practice, as to the advisability of removing gall-stones when found in the course of operations on other parts of the abdomen, whether there have been symptoms atributed to them or not. I would go a step further and advise that whenever gall-stones are found, whether suspected or not, as for example, by the X-ray, the case should be seriously studied with reference to the symptomatology and to the removal of the gall-stones, and just as the surgeon who opens the abdomen for any cause examines the appendix as a routine procedure and removes it (having proper authority to do so) whenever it presents anything pathological, or contains a concretion or mass of fecal matter, or lies in dangerous proximity to any diseased organ, so also should he examine the gall-bladder for the presence of gall-stones as a routine procedure, and finding them should remove them by cholecystostomy, provided, of course, that there be no indication to the contrary.

The mortality in the removal of gall-stones by cholecystostomy in uncomplicated cases is extremely small—less than 1% in Mayo's statistics—and the probability of gall-stones reforming in the gall-bladder when this sac is left behind must be exceedingly small—not a single case discovered in 2,000 operative cases collected by Mayo, which figure doubtless includes many cases in which there had been more or less injury to the gall-bladder.

Such prophylactic operation, and in fact the generally early removal of gall-stones, will in the great majority of cases prevent the long train of more or less serious symptoms which are more than likely to follow, as well as the less common but extremely dangerous late consequences, such as septic cholangitis, empyema of the gall-bladder, acute phlegmonous cholecystitis, perforation and peritonitis, acute and chronic pancreatitis, progressive fat necrosis, stricture of the bile-ducts, intestinal obstruction and many others, not the least of which is the development of carcinoma of the gall-bladder or bile-ducts. The suffering and the mortality from such conditions are too well known to require more than mention.

Finally, from a purely operative standpoint, the late operation is vastly more difficult and dangerous than the early operation because of the presence of tough adhesions, the depression due to cholemia, the tendency to hemorrhage, the necessity for haste because of badly borne anesthetic, the lessened ability of the patient to withstand surgical shock, the presence of highly infectious material in the gall-bladder, etc., etc. Again, complete restitution to the normal cannot be expected to take place if operation is delayed till permanent damage is done the bile passages (contracting scars, strictures, etc.).

To refer again to analogous conditions in appendicitis, I would say that quite in accordance with surgical practice in cases where one or more attacks of appendicitis have been recovered from, modern surgery should consider seriously the propriety of opening the abdomen in all cases where there have been one or more definite attacks of gall-stone colic and the gall-stones removed, for future and more dangerous attacks are quite as apt to occur in the latter as in the former. I do not say that all such patients should be operated upon, but that they should be studied with reference to the advisability of operation, and the operation be done in the absence of definite contra-indication. Furthermore, serious consideration should be given cases of obscure and chronic digestive disturbances, so-called bilious attacks, reflex vomiting, recurrent attacks of indigestion, etc., as to whether the symptoms may not be caused by more or less "quiescent" gall-stones and in the absence of definitely assignable and more probable cause, the abdomen should be opened and the gall-bladder and the bile-ducts explored.

I am led to speak thus strongly as the only logical conclusion to be drawn from a study of my own operative cases. A very large proportion of my operations for gall-stone disease have been late operations and in nearly all of the cases early incision would have shown the presence of the calculi, would have led to their removal and would have prevented the long periods of great suffering and a large mortality. In fact, my mortality thus far has been entirely in cases in which operation was done late in the history of symptoms and after serious complications had arisen as a result of the long-continued presence of the gall-stones.

Furthermore, nearly all of these patients gave the history of symptoms which we can now see would have justified exploratory incision. The delay was not always due to the fact that the patients did not consult physicians; more often than not they had been for long periods under the care of competent physicians sometimes for recurring stomach troubles, and sometimes under the definite diagnosis of gall-

stone disease in one form or another, had been kept on restricted diet, salines, olive oil, etc., for long periods of time. Their symptoms were often relieved, but the final serious complications were not indefinitely postponed. As illustrations of the foregoing, I would report the following 15 cases:

Case I.—**Recurrent attacks of abdominal inflammation, semi-invalidism, exploratory incision, contracted gallbladder, carcinoma, cure.**

Mrs. C., aged 68, widow of a physician, had had 4 or 5 attacks of inflammation variously diagnosed as appendicitis, peritonitis, etc. The attacks would last several days and were characterized by fever, rapid pulse, pain, tenderness on right side of abdomen. For 5 or 6 years she had suffered with indigestion, stools often fatty, more or less boring pain in right abdomen. One physician thought there was some lesion of the pancreas. Patient was never jaundiced, and her nutrition continued good. Examination showed simply slight tenderness over the cecum; no tumor. Incision showed the appendix normal but it was removed according to request of patient. Further incision over the gall-bladder showed that organ cicatrized and surrounded with dense adhesions, liver notched, a large stone in upper part of cystic duct. The gall-bladder was freed, and removed with the stone, the cystic duct being closed with catgut ligature, and the abdomen closed. Complete relief followed. Examination of the gall-bladder revealed a small carcinoma in its inner wall. It is now more than 6 years since the operation and the patient continues in perfect health. There is no sign of recurrence.

The case may be looked upon as one of accidental cure of carcinoma of the gall-bladder, by an operation done by sheer good luck just in time. Early operation would have prevented the formation of the carcinoma. Mayo has reported 3 similar cases 3 years after operation and 2 recent ones.

Case II.—**Frequent attacks of "biliousness" for many years, some accompanied with pain, sudden choledochus obstruction, operation, contracted gall-bladder, extensive adhesions, chronic cholemia, hemorrhage, death.**

Mrs. B., large fleshy woman, age 53, had had frequent attacks of so-called "biliousness" sometimes with pain, attributed to over-eating and too rich food, extending over many years and for which she had had medical treatment. Had never been jaundiced. Two weeks after a rather severe attack of colic, she had another one followed by jaundice indicating stone in the common duct. To exclude catarrhal jaundice patient was kept on liquid food and given salines; she was also given pilocarpine to exclude a hypothetical plug of mucus which might possibly have been obstructing the common duct, the patient becoming weaker and weaker day by day with the intense jaundice, and coal-tar narcotics which were given to produce sleep, and the evident sepsis as shown by fever, leukocytosis of 15,000, etc. Operation was done only as a last resort 4 weeks after the jaundice became complete and the patient was all but in extremis. Incision showed a mass of adhesions completely matting together colon, omentum, duodenum and lower surface of the liver. After cutting these sufficiently to expose the apex of the gall-bladder the latter was found cicatrized over a number of small gall-stones. Attempt was made to remove the gall-bladder but separation of the dense adhesions caused so much bleeding that the attempt had to be abandoned, the gall-bladder was opened and the stones removed with what was possible of the mucous membrane of the gall-bladder. The common duct was opened and 4 large stones removed. A drainage tube was inserted and gauze pack, and the oozing surface of liver was seared with the Paquelin cautery. As the wound was being closed, the patient collapsed and died within half an hour after leaving the operating table. Examination of the wound area after death showed that there had been no concealed hemorrhage, that the common duct had been opened 3 inches above the papilla. Two inches above the papilla there was a marked thickening evidently the point of lodgment of the large obstructing stone with dilatation of the duct above.

This case is a good example of the immense technical difficulties and the dangers encountered when operation is delayed in cases of gall-stone impaction. The whole train of symptoms could have been avoided by removal of the stones before they left the gall-bladder, and the patient would have been in better condition to withstand the shock had operation not been delayed so long after jaundice came on.

Case III:—**Frequent attacks of epigastric pain during 16 years; chronic pancreatitis; fat necrosis; sepsis; death.**

Mrs. B., age 59, very fleshy, had weighed 257 pounds, had had frequent attacks of epigastric pain during 16 years, characterized by vomiting, without jaundice, but with fever and followed by tenderness. Nutrition remained generally good, though digestion was more or less imperfect and patient suffered from frequent headaches. She was sent to the surgeon because of a tumor which was discovered in the epigastrium. The gall-bladder region was tender, and a hard immovable irregular tumor was present in the epigastrium. It was thought to be carcinoma. Exploratory incision was undertaken because of a recent attack of agonizing pain which was thought to be due to gall-stone impaction and because of the indication to forestall pyloric stenosis if such should be impending. It showed the gall-bladder cicatricial and filled with gall-stones; stomach and pylorus free; the tumor lay behind the peritoneum in the region of the pancreas. On opening the gall-bladder bile flowed and it seemed indicated to unite it to the small intestine to prevent choledochus obstruction by the growth of the tumor. This was done with a Murphy button after removal of the gall-stones, but on exposing the tumor by section of the peritoneum it was found to be a great mass of necrotic fat. The patient died on the sixth day of sepsis in the region of the fat necrosis without peritonitis, the infection being with staphylococci and colon bacilli.

While in this case the death was due to sepsis, which was perhaps preventable, it is significant that the attacks of epigastric pain, with more or less fever and vomiting recurring at frequent intervals for 16 years, were never attributed to gallstones. Undoubtedly the pancreatitis and fat necrosis were due to the damage done by passing gall-stones, and could readily have been prevented by a timely operation. The common duct was thickened evidently by old inflammation.

Case IV.—**Chronic invalidism for 17 years; frequent attacks of indigestion with epigastric pain and tenderness; rupture of gall-bladder; localized abscess.**

Mrs. M., age 51, had been a confirmed invalid for 17 years suffering from frequent attacks of indigestion attributed to over-eating, had constant medical attendance, and was kept on one diet after another with practically no benefit. On one occasion she had been in a hospital for several months and was fed on malted milk and similar preparations. After an especially severe attack with some pain, vomiting and local soreness a tender swelling appeared in the right upper abdomen, evidently a localized abscess, which was thought to be of appendiceal origin. Operation at the end of 2 weeks showed distended gall-bladder with abscess of considerable size between it and the liver; peritoneum free. The gall-bladder was stitched to the perietal peritoneum and opened after 24 hours, several ounces of pus being removed. Two weeks later, when the acute process had subsided, the wound was enlarged and 7 immense gall-stones were removed from the gall-bladder, cystic duct and abscess cavity. Although the gall-bladder had been sutured to the peritoneum and not to the skin the fistula failed to close and after 6 months the gall-bladder was removed entire. No additional stones were present, the fistula having remained open because of the chronic inflammation of the wall of the gall-bladder. Patient made an uninterrupted recovery and has been free from her digestive troubles up to the present time—3 years later.

The history of the case makes it evident that the digestive disturbances were due in large measure to the irritation of the gall-stones, and would have ceased had they been removed; the very dangerous conditions which subsequently developed would thereby have been prevented.

Case V.—**Typical gall-stone colic 5 times in 25 years with passage of gall-stones; frequent attacks of less severe pain; constant soreness.**

Mrs. B., age 56, had typical gall-stone colic 25 years ago with passage of great numbers of small stones; 4 subsequent attacks; has been obliged to live on restricted diet ever since, an attack of more or less severe pain invariably following taking of fruit and other easily fermentable foods. She has had more or less constant epigastric pain and tenderness. Patient was very fat, showed no tumor, no jaundice but marked tenderness in region of gall-bladder. Operation undertaken because of a recent severe attack of biliary colic, showed the gall-bladder contracted and filled with stones, the common duct being free. Cholecystectomy was performed but was made very difficult by reason of the anesthetic being badly borne and by very dense adhesions. The cystic duct was drained. Save for some distension, the abdomen presented no untoward symptoms but patient developed a broncho-pneumonia to which she succumbed on the fifth day. Partial autopsy showed broncho-pneumonia, fatty heart and some areas of chronic nephritis.

Case VI.—**Chronic invalidism; operation for strangulated hernia; acute phlegmonous cholecystitis; acute hemorrhagic pancreatitis; extensive fat necrosis; death.**

Mrs. M., age 60, very fat, had suffered for many years with indefinite digestive disturbances, bilious attacks with more or less pain; entered Lane Hospital and was operated on for strangulated umbilical hernia. At the end of 3 weeks, after normal wound healing, when patient was about to leave the hospital she was taken with persistent vomiting. There was no cause evident. She complained of severe pain across the abdomen and rapidly went into collapse, perspiring freely and remaining very weak for some hours. There was no fever and the pulse was but 80 though weak. At the end of 24 hours the pulse rose to 130, the temperature remaining 99°. Next day the pulse was still 130 and the temperature rose to 103°. Patient was given small doses of morphine sufficient to quiet the pain

and repeated enemas containing asafetida in the hope of moving the bowels. Vomiting continued and the abdomen became considerably distended and tender. There was no jaundice and the most obvious diagnosis was intestinal obstruction following the operation for hernia. Operation was demanded in spite of the considerable cardiac weakness and nephritis which was present. Incision was advised but patient consented only after another 24 hours but then faint jaundice appeared and the cause of the symptoms become evident. Karlsbad salts were given and the patient supported by rectal feeding. On the fourth day patient seemed better, the temperature falling to 98.4° and pulse to 120, but towards evening the temperature rose again and on the fifth day patient collapsed, had severe chill, and 3 hours later expired.

Autopsy made by Dr. Ophüls showed acute suppurative cholecystitis, acute cholangitis, gall-bladder filled with a large number of small gall-stones, some stones in cystic duct, papilla not lacerated, choledochus free, no stones in intestine, acute hemorrhagic pancreatitis, extensive fat necrosis, fatty heart, necrosis of renal epithelium with some areas of old nephritis. Cultures showed colon bacilli in gall-bladder and cystic duct, colon baccilli and short rods, negative with Gram, in pancreatic duct.

Case VII.—**Repeated attacks of gall-stone colic; passage of gall-stones; two visits to Karlsbad; chronic pancreatitis; extensive fat necrosis; stenosis of mesenteric vein; gangrene of bowel.**

Mr. R., age 53, for many years had recurring attacks of epigastric pain at times very severe; 3 years ago after a particularly severe attack became jaundiced, was in a sanitarium in San Francisco for some weeks; passed a number of gall-stones about a quarter of an inch in diameter. He then went to Karlsbad where he temporarily improved. Ever since then he has had frequent attacks of epigastric pain similar to the original attacks, with local tenderness and he got to taking morphine pretty regularly for the relief it gave him. He went to Karlsbad a second time remaining about 3 months, but was not perceptibly improved. His nutrition continued good however so that he recently weighed 225 pounds. On the whole his abdominal discomfort pretty continuously increased till finally without special indiscretion on his part he had sudden severe pain in the lower abdomen with rapidly progressing symptoms of peritonitis. Morphine had to be used in full doses; nausea was constant; the abdomen became rapidly distended, hiccoughs continuous; pulse 128 increasing; temperature 100°; tenderness across lower abdomen in spite of the morphine; complete constipation; great abdominal rigidity. The abdomen was opened as soon as patient could be brought to San Francisco, (on the third day of the attack) patient being by this time slightly jaundiced, pulse 130, leukocytes 11,400. On opening the peritoneum a considerable quantity of thin, brown foul-swelling serum was evacuated and a large loop of the small intestine was seen to be gangrenous. Resection was out of the question because of the condition of the patient. The mesentery was therefore cut across (the absence of bleeding suggested thrombosis of the mesenteric artery) and the loop simply hung out of the abdomen. The intestinal wall was greatly thickened as if by chronic congestion, and the line between the gangrenous portion and the sound portion was not definite. Palpation of the gall-bladder showed its walls thick and a number of gall-stones in the cystic duct. These were milked back into the gall-bladder and the abdominal wound closed about the protruding intestine.

The intestine was opened next morning and both ends irrigated to a depth of 18 inches and a quantity of magnesium sulphate solution injected. Retching continuing the stomach was washed out evacuating about a quart of dark fluid. Patient became continuously weaker and died in the afternoon.

Autopsy by Dr. Ophüls showed fat necrosis extending beneath the posterior peritoneum as far as the appendix. One process of the cavity containing the necrotic fat surrounded and constricted a large radicle of the portal vein, the lumen remaining about 2 mm. in diameter and filled with a blood clot not many days old. The gall-bladder contained 13 gall-stones averaging 1 cm. in diameter and myriads of minute stones, many of which were found in the common and hepatic ducts. The hepatic duct was dilated to 3 times its normal diameter, the lower portion of the common duct almost obliterated by cicatricial contraction and the pancreatic duct open.

Whether the fat necrosis was due to the attack of 3 years before, when stones were first passed, or to subsequent trouble, is scarcely to be determined; nor can it be said now that the diagnosis could have been made before that time. Still there can be no reasonable doubt that had the gallstones been removed before they left the gall-bladder the whole clinical picture would have been different.

Case VIII.—**Recurrent attacks of vomiting, one persisting for six weeks, gall-stones removed from cystic duct, recovery.**

Mrs. J., age 52, had always been a strong hard working woman; for several years back had had occasional attacks of indigestion with persistent vomiting. No typical colic. When feeling perfectly well and without any assignable cause, patient began to vomit. She had no pain, no chill, no fever and no icterus but vomited continuously for 5 weeks in spite of frequent lavage of the stomach and other appropriate treatment. Patient was kept alive by rectal feeding, but rapidly emaciated. The vomitus at first containing a large proportion of bile, later became clear and finally chocolate colored; it was generally acid and would foam on addition of bi-carbonate of soda. Castor oil was passed by rectum which, with the absence of abdominal distress and distension, excluded intestinal obstruction. Pelvic examination was negative, there was no tumor of the gall-bladder and nothing to be made out except a slight degree of local tenderness over the gall-bladder.

Incision showed gall-bladder practically normal, covered with shining epithelium. Two gall-stones lay impacted in the upper part of the cystic duct. Their removal by cholecystectomy sufficed to relieve the persistent vomiting. Patient retained liquid food given by stomach within 24 hours and had no subsequent digestive trouble. The fistula failed to heal, however, and required closure some months later, since when (2 years) patient has been in excellent health.

Case IX.—**Sick headache for many years; frequent attacks of colic and acute indigestion for 15 years; nearly constant distress in upper abdomen; pancreatic cyst; drainage; cholecystostomy, recovery.**

Mrs. J., age 54, had suffered since childhood with sick headaches and for 15 years with acute indigestion, "bilious attacks" coming on every few days, for which she was accustomed to wash out her stomach and with great relief. In fact she learned to ward off the attacks by washing the stomach. Attacks of violent straining and constant pulling sensations in the upper abdomen caused a great deal of distress. She lived on very restricted diet; the least variation from it would bring on an attack. On one occasion 10 years ago she was obliged to go without food for 16 days, a tender tumor appearing in the right side below the ribs (probably distended gall-bladder) but this subsided after a time. Twice within a year she had typical biliary colic so severe as to require morphine.

Four months before coming under my care she discovered a tumor in the upper abdomen a little to the right of the median line. This has gradually increased since. Examination showed a spherical tumor 5 or 6 inches in diameter of the consistency of a tense cyst, situated between umbilicus and navel. It was evidently a cyst of the pancreas. Operation confirmed the diagnosis but showed a gall-bladder filled with gall-stones but otherwise not much damaged; bile ducts free. The stones were removed by cholecystectomy, and the pancreatic cyst drained. The pancreas itself seemed harder than normal. Recovery was uneventful and up to the present time, 2½ years, patient has enjoyed perfect health, has gained 30 pounds or more in weight and has been free from the pulling and straining previously complained of and can eat any ordinary food with impunity.

Whether there is any etiological relation between the gall-stones and the pancreatic cyst is not to be definitely determined, but the cyst certainly followed the gall-stone colic as well as the chronic pancreatitis.

Case X.—**Acute cholecystitis; cholecystectomy; recovery.**

Mrs. C., aged 40, had generally had good health, and gave a history of nothing more than indefinite digestive disturbances. When feeling perfectly well had sudden attack of inflammation in the right upper abdomen, with pain, tenderness, muscular rigidity, tumor of gall-bladder; leukocytes 18,000. On the sixth day when the inflammation had somewhat quieted down the abdomen was opened, the thickened gall-bladder was removed and the cystic duct drained. The gall-bladder contained half a dozen large stones; the ducts were free. Convalescence was uninterrupted; patient left hospital on the 21st day.

Case XI.—**Frequent attacks of gall-stone colic; complete choledochus obstruction; cholecystectomy; carcinoma; death.**

Mrs. B., age 50, had had frequent attacks of typical billary colic besides much dull pain for which she was obliged to take codeine; was operated upon in Chicago, the gall-stones removed by cholecystostomy. Subsequently, jaundice appearing, the common duct was opened and a stone removed from it and cholecystectomy performed by the same surgeon. Patient was well for 3 years when jaundice came on again without pain, chill or fever. Treatment was instituted on the supposition that the jaundice was catarrhal.

The choledochus obstruction was complete and continued without cessation so an exploratory incision was determined upon. It showed a cyst pressing on the hepatic duct but exploration of the common duct through an incision and again through the duodenum showed no other cause for the obstruction than the cyst. This was evacuated and drained and patient was greatly relieved for some months. The contents of the cyst on examination showed epithelial debris which suggested carcinoma. Gradually the jaundice returned (it had never quite disappeared but the itching was relieved) but the stools always contained some bile. Patient died 10 months later. Autopsy showed extensive carcinoma of the liver, but not involving the main ducts.

Case XII.—**Several attacks of billary colic; long periods of indigestion; chronic cholecystitis; choledochus obstruction; removal of stone; recovery.**

Mrs. V., age 50, had suffered numerous attacks of colic and digestive disturbances for several years. Complete choledochus obstruction came on and after 4 weeks patient came to operation. The gall-bladder was contracted over a number of small stones and was removed and a large stone obstructing the common duct was removed by incision. The duct was drained and convalescence was

without incident. Patient was seen 6 months after the operation and was completely relieved.

Case XIII.—**Chronic indigestion; frequent attacks of vomiting; some dull pain; one or two attacks of colic; rupture of gall-bladder; cholecystectomy; recovery.**

Mr. J., age 40, had suffered with digestive troubles for 20 years, had had frequent attacks of vomiting without apparent cause, some dull pain quite persistent, one or two attacks of severe colic, no jaundice. Patient had to live on liquid food a good part of the time and finally had to give up his business. One day he was seized while on the street with violent pain in the abdomen which required a grain of morphine to control; the abdomen became rapidly distended and tender throughout and the pulse rose above 120. After 24 hours, when seen by me, the abdomen was softer and the bowels had been moved with castor oil. The greatest tenderness was over the appendix and rectal examination showed tenderness of the pelvic peritoneum. A diagnoses of acute appendicitis was made and patient brought to hospital for operation. Incision showed the appendix normal but it was removed according to patient's request. There was some peritoneal fluid stained with bile which showed that the gall-bladder had ruptured but the glistening peritoneum excluded severe peritonitis. The incision was closed and the gall-bladder exposed by a second incision. Being full of stones and having perforated at its apex it was removed, and the cystic duct drained. Convalescence was uneventful and since then patient has been greatly relieved and can now eat ordinary food with impunity.

The bile in the peritoneum and the contents of the gall-bladder showed no bacteria in culture and in smears and the peritoneum showed no reaction when exposed in the operation.

Case XIV.—**Recurrent cholecystitis; colic; chronic cholemia from choledochus obstruction; cholecystectomy; exploration of common duct; death.**

Mr. C., age 60, with large fat abdomen had had years of digestive disturbances, with colic; had passed gall-stones; was operated upon 2 years ago by a San Francisco surgeon who removed some 50 gall-stones from the gall-bladder by cholecystostomy. Both fistula and jaundice persisted, making it evident that there was a stone in the hepatic duct which had been overlooked. Operation during cholemia of 2 years duration was further made very difficult by the extensive and very dense adhesions; the fat abdomen, and because of a weak heart; the anesthetic was badly borne. The common duct was opened, a stone 1 cm. in diameter was removed, the gall-bladder also. The cystic duct was drained. Patient did not rally from the depression of the operation though the blood lost was not great, and died next morning. Autopsy not permitted.

Case XV.—**Chronic indigestion; frequent attacks of colic; tumor; cholecystectomy; recovery.**

Mr. H., age 55, had had indigestion for years, often in painful attacks; was obliged to live on restricted diet; at times took nothing but milk for weeks; was never jaundiced. Examination of stomach contents on one occasion showed absence of hydrochloric acid. There was some dilatation of the stomach and an irregular tumor was evident to the right of the median line, which was thought to be carcinoma of the pylorus. Incision over the tumor showed it to be a distended gall-bladder covered with adherent coils of intestine and filled with gall-stones; the ducts free. The gall-bladder was removed and the cystic duct drained. Recovery was uneventful, patient leaving hospital in ambulance at the end of a week, the fistula closing soon afterwards. Since then patient has been able to eat all sorts of foods without distress although it is but a few weeks since the operation.

A brief summary of these 15 cases is appended.

The average duration of symptoms definitely attributable to the presence of gall-stones before operation in these cases was 12 years. I have no doubt that if the cases had been carefully studied from the beginning the diagnosis of gall-stone disease could have been made much earlier. Of the 15 cases, 8 recovered and 7 died. Three of the deaths may be ascribed to the operation, but they were all in very fat people, one of broncho-pneumonia and two of hemorrhage and shock, both cases with prolonged icterus, and extensive adhesions, and both cases so depressed that they would have died very shortly without operation; in fact, in both cases operation was done as a last resort. The same is true of a fourth case in which multiple abscesses developed after operation at the site of extensive fat necrosis. The other causes of death were acute hemorrhagic pancreatitis, stenosis of mesenteric vein with gangrene of the bowel as the result of fat necrosis and carcinoma of the bile ducts, one case each.

These 15 cases exhibited the following complications: chronic cholecystitis with cicatricial contraction of the gall-bladder, 6; carcinoma, 2 (one cured); perforation of the gall-bladder, 2; chronic cholæmia, 2; acute hemorrhagic pancreatitis, 3; chronic pancreatitis with fat necrosis, 4; pancreatic cyst, 1; acute phlegmonous cholecystitis, 2; persistent uncontrollable vomiting, 1; cicatricial stricture of choledochus, 1; adhesions dense and extensive enough to make operation hazardous, 7. In these complications may be seen the determining cause of the mortality in most of the seven fatal cases, and the immediate cause of most of the suffering in the whole series. Such complications can be prevented by timely operation, and by that alone.

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## THE SURGICAL TREATMENT OF PANCREATIC COMPLICATIONS IN GALL-STONE DISEASE.*

By ANDREW STEWART LOBINGIER, M. D., Los Angeles.

AS EARLY as 1892 Mr. Mayo Robson had observed the frequency with which gallstones in the choledochus were associated with enlargement of the head of the pancreas. Körte had called attention to the same fact, and Lancereaux, in 1898, expressed his belief that a stone lodged in the ampulla of Vater was a strong etiologic factor in the infection of the pancreas. In 1901 Opie published his brilliant clinical observations and subsequent experimental studies on the partial obstruction of the ampulla by a small gallstone. He was the first to demonstrate the influence of a small-sized concretion in producing regurgitation of bile through the duct of Wirsung, with a sequel of pancreatitis. Since then much of the pathology of the various forms of pancreatitis hitherto obscure has become well defined. Recent contributions of a clinical character, which are continually appearing in the literature, have added greatly to the interest in the study of the pancreas in disease.

The necessary limits of this paper impose a very difficult task, and compel the most cursory treatment of a field possessing a wealth of pathologic and surgical interest.

Diagnosis. The symptoms of acute hemorrhagic pancreatitis may be so acute and agonizing as to overwhelm the patient. The attack is ushered in with violent vomiting, intense pain in the epigastrium, and occasionally collapse. The recti become rigid, and within 24 hours a tumor forms above the umbilicus. This tumor may not be apparent if the rigid recti and intense pain render the abdomen impalpable, or if a tympanitic stomach intervenes. In the differential diagnosis, phlegmonous cholecystitis, perforation of the stomach or duodenum, intestinal obstruction or acute gangrenous appendicitis will need to be considered. Each of these can usually be excluded by the anamnesis.

Reginald Fitz has given us an intelligent picture in saying that, "Acute pancreatitis is to be suspected when a previously healthy person or sufferer from occasional attacks of indigestion, is suddenly seized with violent pain in the epigastrium, followed by vomiting, collapse, and in 24 hours by a circumscribed epigastric swelling, tympanitic or resistant, with a slight rise of temperature."

Halsted regards excessive pain and cyanosis of the face and abdomen as typical. The pain which at first was definitely in the epigastrium, later becomes general; the vomiting is a dark bile-stained hemorrhagic fluid; the temperature is erratic and the pulse rapid and weak. Intestinal obstruction from pressure of the effusion on the duodenum may complicate the symptom complex. Fat may be found in the stools and sugar in the urine. The former will depend upon the dissemination of the pancreatic ferment in the tissues; the latter upon the involvement of the islands of Langerhans.

Treatment. In the acute form of pancreatitis, commonly known as acute hemorrhagic, it will be necessary to remember that in certain of the less severe cases the patient may recover without surgical interference. On the other hand there is a type representing the other extreme, where the most prompt and

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